**DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Office of Structural Materials
Quality Assurance and Source Inspection

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Contract #: 04-0120F4
Cty: SF/ALA Rte: 80 PM: 13.2/13.9
File #: 69.28

# WELDING INSPECTION REPORT

**Resident Engineer:** Pursell, Gary
**Address:** 333 Burma Road
**City:** Oakland, CA 94607

**Report No:** WIR-000070
**Date Inspected:** 01-Dec-2006

**Project Name:** SAS Superstructure
**Prime Contractor:** American Bridge/Fluor Enterprises, a JV
**Contractor:** Zhenhua Port Machinery Company, Ltd (ZPMC), Changxing Island

**OSM Arrival Time:** 800
**OSM Departure Time:** 1700
**Location:** Shanghai, China

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| **CWI Name:** | Liu Liu | | | **CWI Present:** | ☑ Yes | ☐ No | |
| **Inspected CWI report:** | ☑ Yes | ☐ No | ☐ N/A | **Rod Oven in Use:** | ☐ Yes | ☐ No | ☑ N/A |
| **Electrode to specification:** | ☑ Yes | ☐ No | ☐ N/A | **Weld Procedures Followed:** | ☐ Yes | ☐ No | ☑ N/A |
| **Qualified Welders:** | ☑ Yes | ☐ No | ☐ N/A | **Verified Joint Fit-up:** | ☑ Yes | ☐ No | ☐ N/A |
| **Approved Drawings:** | ☐ Yes | ☑ No | ☐ N/A | **Approved WPS:** | ☐ Yes | ☐ No | ☑ N/A |
| | | | | **Delayed / Cancelled:** | ☐ Yes | ☑ No | ☐ N/A |

**Bridge No:** 34-0006
**Component:** N/A

**Summary of Items Observed:**

Office of Structural Materials Quality Assurance Inspector (QA), David McClary observed quality control functions related to procedure qualification (PQR) testing at the ZPMC facility in Shanghai, China for the San Francisco Oakland Bay Self Anchored Suspension Bridge.

The QA Inspector reviewed the Radiographic Testing (RT) film for 1G (flat) Flux Cored Arc Welding (FCAW) Procedure Qualification (PQR) identified as HP-2006107. The film was rejected by ZPMC Quality Control (QC) for lack of fusion both at the root and interpass.

The QA Inspector reviewed the Radiographic Testing (RT) film for 1G (flat) Gas Metal Arc Welding (GMAW) Procedure Qualification (PQR) identified as HP-2006119. The film was accepted by ZPMC Quality Control (QC). The QA Inspector observed porosity in the weld greater than 1.6mm (maximum 5mm) with adjacent porosity >1. mm. The adjacent porosity was less than the minimum spacing requirement (C from AWS D1.5 Figure 6.8), and therefore rejectable. The QA Inspector also observed small porosity throughout the weld, that although not rejectable by itself would probably have affect the outcome of any mechanical tests. (See conversations for additional details.)

The QA Inspector observed welding of a Procedure Qualification (PQR) test plate identified as HP-2006107-1 (re-test). The test was conducted using Flux Cored Arc Welding (FCAW), Hyundai Supercored 71H, electrode in the 1G (flat) position to AWS D1.5, Section 5.12.1 (Maximum Heat Input). The QA Inspector observed ZPMC Quality Control (QC) recording the essential variable (amps, volts, travel speed) for each pass and randomly verified the parameters using a Fluke® amperage / voltage meter and a stopwatch. The welding appeared to comply with the contract documents. Note: ZPMC starting using a grinder on the test to grind the weld toes

between passes to ensure thorough fusion. See TL-6032 from QA Inspector Mark Wright for additional details.

The QA Inspector observed mechanical testing of the 3G (Vertical) Flux Cored Arc Welding (FCAW) Minimum Heat Input Procedure Qualification (PQR), identified as HP-2006118. All of the mechanical tests appeared to comply with the contract documents. Note: Charpy-V Notch impact tests were performed to the requirements of Seismic Performance Critical Members (SPCM) at -30 degrees Celsius.

The QA Inspector viewed the new shop facilities still under construction. It appears the electrical power has been run through underground trenches to various areas of the facility. QA observed tracks and gantry cranes, but it is not apparent if these will be a permanent part of the facility or if they are just temporary for the work ZPMC is performing on container cranes currently being constructed on the concrete pads.



**Summary of Conversations:**

The QA Inspector spoke with ZPMC Quality Control (QC) and explained the RT spacing requirement for discontinuities greater than 1.6mm. Although the individual discontinuities were acceptable by code, the spacing between discontinuities was less than allowed, and the discontinuities needed to be evaluated as a single discontinuity.

**Comments**

This report is for the purpose of determining conformance with the contract documents and is not for the purpose of making repair or fit for purpose recommendations. Should you require recommendations concerning repairs or remedial efforts please contact Mazen Wahbeh, (818) 292-0659,, who represents the Office of Structural Materials for your project.

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| **Inspected By:** | McClary,David | Quality Assurance Inspector |
| **Reviewed By:** | Lowry,Patrick | QA Reviewer |